

REMARKS / DISCUSSION OF ISSUES

The present amendment is submitted in response to the Final Office Action mailed May 11, 2011. In view of the amendments above and remarks to follow, reconsideration and allowance of this application are respectfully requested

Status of Claims

Upon entry of the present amendment, claims 29-54 will remain pending in this application. Claims 29 and 46 have been amended. Applicants respectfully submit that no new matter is added by the present amendments. In light of the above amendments and the following remarks, Applicants respectfully submit that all presently pending claims are in condition for allowance.

Interview Summary

Applicants appreciate the courtesy granted to Applicant's attorney, Michael A. Scaturro (Reg. No. 51,356), during a telephonic interview conducted on Monday, August 29, 2011. Discussion was directed to a proposed amendment to the independent claims to more clearly distinguish over the cited and applied art, i.e., Marz. The Examiner agreed that the proposed amendment appeared to distinguish over Marz, however, the Examiner will revisit Marz to confirm her impressions. In the event the amendment overcomes Marz, it was indicated that a further search is required.

Double Patenting

Claims 1-18 and 20-27 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-18 and 20-28 of copending Application No. 10/574,141 and claims 1-22 and 24-35 of copending Application No. 10/574,140. The Applicants acknowledge this provisional rejection and will address the rejection if the claims of the applications are deemed allowable and remain subject of a non-provisional double patenting rejection.

Claim Rejections under 35 USC §102

- I. In the Office Action, Claims 1, 2, 5, 8, 10, 11, 13-18 and 22-27 stand rejected under 35 U.S.C. § 102 (e) as being anticipated by U.S. Patent No. 6,593,904 (“Marz”).

In Applicant’s previously submitted response, Claims 1-28 have been canceled and re-written as claims 29-46. Hence, the rejection of claims 1, 2, 5, 8, 10, 11, 13-18 and 22-27 corresponds one for one to the rejection of claims 29, 30, 33, 36, 38, 39, 41-46.

Independent Claims 29 and 46 have been amended herein to better define Applicant’s invention over Marz. Claims 29 and 46 now recite limitations and/or features which are not disclosed by Marz. Therefore, the cited portions of Marz do not anticipate claims 29 and 46, because the cited portions of Marz do not teach every element of claims 29 and 46. For example, the cited portions of Marz do not disclose or suggest,

a grey scale compensation device for optimizing grey scale rendering by compensating for a predetermined viewing angle dependency by compensating for variations in slope of the different transmission – voltage (T-V) characteristics of each viewing angle such that a grey scale displayed by said plurality of pixel groups is independent of the viewing angle, wherein a correction applied to each of the plurality of pixels within the group is different.

(As recited in independent claim 29)

applying grey scale correction values to a plurality of pixel data values within each group to optimize grey scale rendering by compensating for a predetermined viewing angle dependency by compensating for variations in slope of the different transmission-voltage (T-V) characteristics of each viewing angle, such that a grey scale displayed by the plurality of pixel groups is independent of the viewing angle and for compensating for an optical characteristic of each pixel in a second axis of the display panel, wherein the second axis is transverse to the first axis, by controlling an amount passing through each pixel according to a three dimensional grey scale image to be displayed,

wherein the grey scale correction values applied to each of the plurality of pixels within the group are different; and

(As recited in independent claim 46)

Support for the amendment can be found throughout the specification and in particular at paragraphs 33-39, reproduced as follows for convenience. As described in the specification, in accordance with the invention, it is thus proposed to use a different range of driving voltages for the different pixels of a group so that the (transmission v. voltage) T-V characteristic for each pixel in the group is more closely matched. Otherwise, using the same voltage range to drive each pixel in a group will undesirably result not only in a different set of grey scale values for a given drive voltage, but even a grey scale inversion in that the slope of the T-V characteristic is reversed. As clearly stated in par. 39 of Applicant's specification, the grey scale compensation device preferably substantially normalises a grey scale displayed by a group 16 of pixels to that of the other pixels in the group for any given location in the display panel. The perceived grey scale rendering thereby becomes independent of the viewing angle. **Yet more generally, compensation may be made for the variations in slope of the different T-V characteristics of each viewing angle.**

Applicant's Specification discloses at par. 33 – 39

[0033] FIG. 3 shows transmission (T) versus voltage (V) characteristics 30 for a display panel 15 in the form of a 90 degree twisted nematic LCD. The first curve 31 (solid line) is the T-V characteristic for a viewing angle $\phi = 0$ degrees (e.g. pixel 0). The second curve 32 (broken line) is the T-V characteristic for a viewing angle $\phi = 50$ degrees (e.g. pixel 5). It will be noted that the variation in transmission coefficient for a pixel viewed at $\phi = 0$ is such that to obtain a suitable grey scale range an operating voltage of between 0 and V1 is suggested, depending on the grey scale value required to be displayed. **However, it will be noted that use of the same voltage range to drive pixel 5 will result not only in a different set of grey scale values for a given drive voltage, but even a grey scale inversion in that the slope of the T-V characteristic is reversed.** [Emphasis Added]

[0034] In accordance with the invention, it is thus proposed to **use a different range of driving voltages** for pixel 5 ($\phi_i = 50$ degrees), namely that portion lying between V_1 and V_2 , so that the T-V characteristic for pixel 5 is more closely matched to that of pixel 0. [Emphasis Added]

[0035] More generally, an **appropriate portion of the T-V characteristic may be selected for each viewing angle ϕ_i** , (or for as many angles as are present in the display panel). [Emphasis Added]

[0036] **Yet more generally, compensation may be made for the variations in slope of the different T-V characteristics of each viewing angle.** [Emphasis Added]

[0037] Where the T-V characteristics of two different viewing angles are sufficiently close, a common voltage range and/or compensation may be made for those two viewing angles.

[0038] The present invention therefore provides a grey scale compensation device that controls the optical characteristic of each pixel 0 . . . 7 in a group 16 so as to compensate for the viewing angle.

[0039] The grey scale compensation device preferably substantially normalises a grey scale displayed by a group 16 of pixels to that of the other pixels in the group for any given location in the display panel. The perceived grey scale rendering thereby becomes independent of the viewing angle.

It is respectfully submitted that Marz is not directed to resolving a problem of grey scale dependency as the light rays of the different views travel through the liquid crystal at different angles (i.e., the different views). That is, Marz is silent with regard to performing grey scale compensation for a predetermined viewing angle dependency by compensating for variations in slope of the different T-V characteristics of each viewing angle.

Marz describes in the background that it is well known that to avoid gray-scale value corruptions in image rendering, liquid crystal cells are operated in an approximately linear voltage range where the voltage applied to the cells is approximately linear, whereas **there exists a typically non-linear dependence between the transparence of the liquid crystal cells and the voltage applied to them.** Marz is directed to overcoming this prior art limitation by making it possible to set optimum

contrast ratios for specific viewing angle ranges via a largely unlimited selection of the voltage range and to better adjust the range within which the transparenance of the liquid crystal cells is changed to display the gray-scale values to the background lighting. In order to increase the voltage range to set optimum contrast ratios for specific viewing angles within which the liquid crystal cells can be operated without distortion of the image rendering.

Marz utilizes a correction device which distorts the gray-scale signals reaching the liquid crystal cell based on information concerning the typical dependence between the optical transparenance of the liquid crystal cells and the voltage applied to them and as a function of the potential difference between the gray-scale signals and the reference potential in such a way that an at least approximately linear relationship results between the optical transparenance of the liquid crystal cells and the undistorted gray-scale signals. See Marz, Abstract.

Based on the above, Applicants respectfully note that resolving a problem of grey scale dependency as the light rays of the different views travel through the liquid crystal at different angles dependency by compensating for variations in slope of the different transmission-voltage (T-V) characteristics of each viewing angle, as taught and recited in Applicant's independent claims, is different from compensating for a non-linear dependence between brightness H (or synonymously the optical transparenance of liquid crystal cells) and the voltage applied to them, as taught in Marz. It has been clearly shown that Marz does not address the issue of resolving anomalies in grey scale dependency dependent upon the different viewing angles.

It is therefore respectfully submitted that Marz does not appear to disclose, suggest or provide motivation for the limitations set forth in claims 29, 30, 33, 36, 38, 39, 41-46. In view of the above, Applicants respectfully submit that the rejections of claims 29, 30, 33, 36, 38, 39, 41-46.

Claim Rejections under 35 USC 103

- I. The Office has rejected claims 3, 4, 9, 12 and 20-22 under 35 U.S.C. §103(a) as being unpatentable over Marz in view of U.S. Patent No. 6,344,837 (“Gelsey”). Applicants respectfully traverse the rejections.

Claims 3, 4, 9, 12 and 20-22 are allowable

Canceled claims 3, 4, 9, 12 and 20-22 correspond to claims 31, 32, 37, 40, 48-50. As explained above, the cited portions of Marz do not disclose or suggest each and every element of independent claims 29 and 46 from which claim 31, 32, 37, 40, 48-50 respectively depend. Gelsey does not disclose each of the elements of claims 29 and 46 that are not disclosed by Marz. For example, the cited portions of Gelsey fail to disclose or suggest,

a grey scale compensation device for optimizing grey scale rendering by compensating for a predetermined viewing angle dependency by compensating for variations in slope of the different T-V characteristics of each viewing angle such that a grey scale displayed by said plurality of pixel groups is independent of the viewing angle, wherein a correction applied to each of the plurality of pixels within the group is different.

Instead, Gelsey is merely cited for teaching a three dimensional display having a plurality of line sources of illumination.

Hence claims 29 and 46 are allowable and claims 31, 32, 37, 40, 48-50 are allowable, at least by virtue of their respective dependence from claims 29 and 46.

- II. The Office has rejected claims 6 and 7 under 35 U.S.C. §103(a) as being unpatentable over Marz in view of U.S. Patent Application No. 2001/0028356 (“Balogh”). Applicants respectfully traverse the rejections.**

Claims 6 and 7 are allowable

Canceled claims 6 and 7 correspond to claims 34 and 35. As explained above, the cited portions of Marz do not disclose or suggest each and every element of independent claim 29 from which claim 34 and 35 depend. Balogh does not disclose each of the elements of claim 29 that are not disclosed by Marz. For example, the cited portions of Balogh fail to disclose or suggest, *each pixel of each group being imaged into a different view of the three dimensional image*. Instead, Balogh is merely cited for teaching a three dimensional display having a plurality of line sources of illumination.

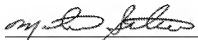
Hence claim 29 is allowable and claims 34 and 35 are allowable, at least by virtue of their respective dependence from claim 29.

Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that all claims presently pending in the application, namely, Claims 29-54 are believed to be in condition for allowance and patentably distinguishable over the art of record.

If the Examiner should have any questions concerning this communication or feels that an interview would be helpful, the Examiner is requested to call Mike Scaturro, Esq., Intellectual Property Counsel, Philips Electronics North America, at 516-414-2007.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Michael A. Scaturro', is written over a horizontal line.

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